



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL MARINE FISHERIES SERVICE  
Northwest Region  
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NMFS Tracking  
No. 2003/00459

April 8, 2004

Thomas F. Mueller  
Seattle District  
Corps of Engineers  
Regulatory Branch - CENWS-OD-RG  
P.O. Box 3755  
Seattle, Washington 98124-3755

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation on the Steve West Bulkhead Replacement, Thurston County, Washington (COE No. 200001306) (HUC 17110019, Puget Sound)

Dear Mr. Mueller:

Attached is NOAA's National Marine Fisheries Service's (NOAA Fisheries) Biological Opinion (Opinion) on the Steve West Bulkhead Replacement in Thurston County, Washington. This Opinion was prepared in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*) and the Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended (16 U.S.C. 1801 *et seq.*).

The Corps of Engineers (COE) had determined, under the ESA, that the proposed action, as detailed within the Biological Evaluation (BE) and associated documents, is likely to adversely affect the Puget Sound chinook salmon (*Oncorhynchus tshawytscha*), which is listed as a threatened species under the ESA.

The Opinion and the Essential Fish Habitat (EFH) consultation are based on information provided by the COE in the BE received by NOAA Fisheries on April 22, 2003, and additional information transmitted via telephone conversations, meetings, mail and e-mail. A complete administrative record of this consultation is on file at the Washington State Habitat Office.

NOAA Fisheries concludes in this Opinion that implementation of the proposed action is not likely to jeopardize the continued existence of Puget Sound chinook salmon. Please note that the incidental take statement (*section 2.6* of the Opinion) includes nondiscretionary reasonable and prudent measures and terms and conditions designed to minimize take of Puget Sound chinook



salmon. NOAA Fisheries also concludes that the project will adversely affect EFH for Pacific salmon; conservation recommendations can be found in Section 3.0 of the attached document.

Thank you for your efforts to protect threatened Puget Sound chinook. If you have any questions regarding this consultation please contact Stephanie Ehinger of my staff at (360) 534-9341.

Sincerely,

*for Michael R. Crouse*

D. Robert Lohn  
Regional Administrator

Enclosure

cc: Jonathan Smith, COE  
Steve West

Endangered Species Act - Section 7 Consultation  
Biological Opinion  
And  
Magnuson-Stevens Fisheries Conservation and Management Act  
Essential Fish Habitat Consultation

Steve West Bulkhead Replacement  
Thurston County, Washington

Agency: U.S. Army Corps of Engineers

Consultation Conducted By: National Marine Fisheries Service,  
Northwest Region

Date: April 8, 2004

for Michael R Crouse

Issued by: D. Robert Lohn  
Regional Administrator

NMFS Tracking No. 2003/00459

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## 1.0 INTRODUCTION

The Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531-1544), as amended, establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat on which they depend. Section 7(a)(2) of the ESA requires Federal agencies to consult with the NOAA's National Marine Fisheries Service (NOAA Fisheries) and United States Fish and Wildlife Service (together "the Services"), as appropriate, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species, or destroy or adversely modify their critical habitat, if designated. This biological opinion (Opinion) is the product of an interagency consultation pursuant to section 7(a)(2) of the ESA and implementing regulations 50 CFR 402.

This document also fulfills the Essential Fish Habitat (EFH) consultation requirements under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1801 *et seq.*). The MSA established procedures designed to identify, conserve, and enhance EFH for those species regulated under a Federal fisheries management plan. Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (section 305(b)(2)).

The United States Army Corps of Engineers (COE) proposes to issue a permit for stabilizing an existing bulkhead in the Nisqually Reach, Thurston County. The project will occur within the geographic range of the Puget Sound (PS) chinook (*Oncorhynchus tshawytscha*) Evolutionarily Significant Unit (ESU). An ESU is considered a genetically identifiable component of a species that may be protected under the ESA. This action will also occur within the designated EFH for chinook, coho (*O. kisutch*) and PS pink salmon (*O. gorbuscha*). The COE is proposing the action according to its authority under section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) and section 404 of the Clean Water Act (33 U.S.C. 1344).

### 1.1 Background and Consultation History

This document is based on information provided in the Biological Assessment (BA), EFH assessment, and additional information as follows:

- NOAA Fisheries received the BA, the EFH assessment, and a letter from the COE requesting formal consultation on April 22, 2003. The BA was dated August 17, 2000.
- NOAA Fisheries requested additional information and clarification on the proposed need for the project, project design, and impacts, on May 28, October 8, and October 29, 2003. The COE responded on July 23, 2003, to the May 28 request but did not respond to the October 8 and October 29 requests. In October and November 2003, NOAA Fisheries collected the missing information with the help of the Washington Department of Fish and Wildlife (WDFW), Thurston County, and the private contractor John Evans.

- NOAA Fisheries initiated formal ESA consultation and EFH consultation on November 17, 2003.

All correspondence is documented in the administrative record, located at the Washington State Habitat Office, Lacey, Washington.

## **1.2 Description of the Proposed Action**

Proposed actions are defined in the Services' consultation regulations (50 CFR 402.02) as "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas." Additionally, 16 U.S.C. 1855(b)(2) defines a Federal action as "any action authorized, funded, or undertaken or proposed to be authorized, funded, or undertaken by a Federal agency." The COE proposes to permit the below-described construction activities. These activities are likely to adversely affect listed salmonids and their essential fish habitat. Therefore, the COE must consult under ESA section 7(a)(2) and MSA section 305(b)(2).

The proposed permit covers construction activities to stabilize an existing failing 80-foot long concrete bulkhead. The project includes placing large angular rock waterward of the existing bulkhead. The new bulkhead would extend a maximum of five feet waterward from the toe of the existing bulkhead. The base row would be placed a minimum of 18 inches below beach grade and consist of four to six man size rocks. The new bulkhead would consist of approximately 106 cubic yards of large angular rock. Voids would be filled with quarry spalls. On the northern end of the existing bulkhead concrete steps extend about 30 feet waterward of the existing rock bulkhead. The applicant proposes to remove these steps. New steps would be integrated into the new rock bulkhead and not extend Waterward of the footprint of the new bulkhead. The existing boat-way's concrete footings would be removed and disposed of at an upland site.

The applicant also proposes to place a new boathouse immediately landward of the new bulkhead. The dimensions of the boathouse would be 18 feet by 14 feet and 22 feet high. Delivery of materials and construction are proposed to be limited to the upland. No heavy equipment would be used. All excavation would be done by hand. Construction would take place during the summer.

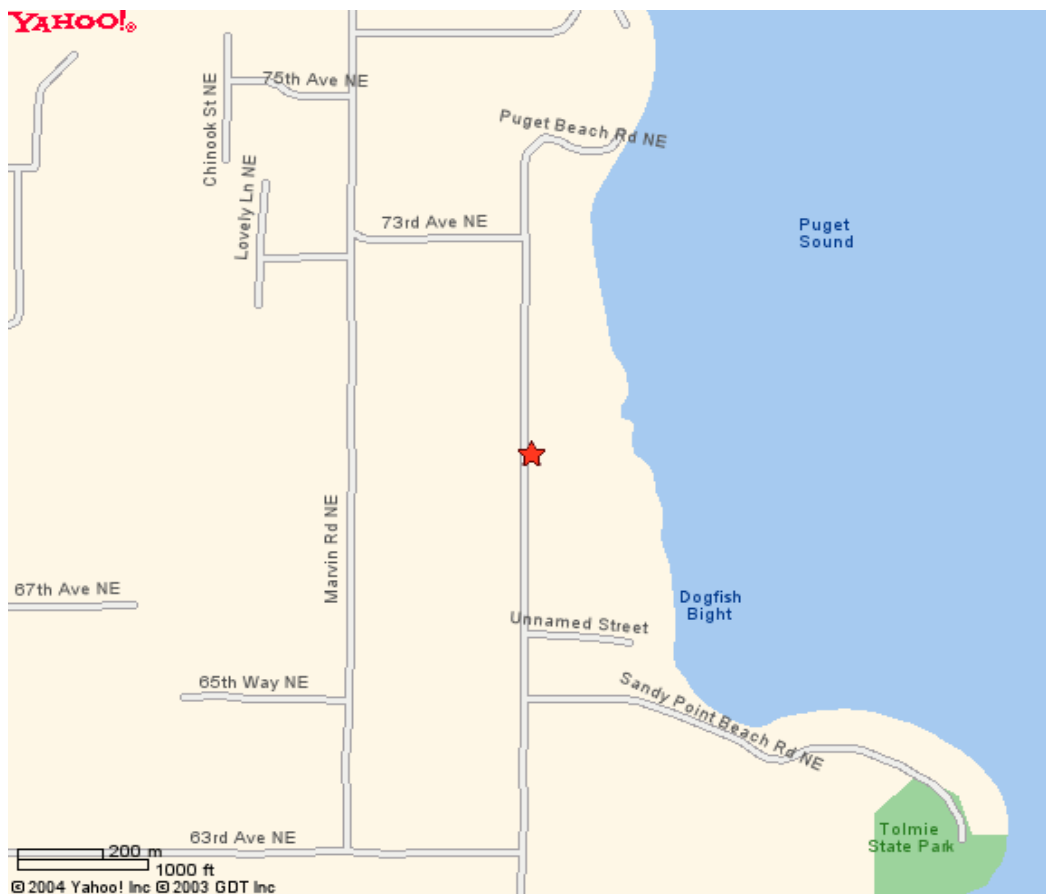
The applicant would construct the bulkhead during the summer construction window (June 15 to October 15) over a maximum period of three days. A barge would deliver two track excavators and material to the site. One track excavator would work entirely on the barge delivering material, the second track excavator would work on the beach excavating and placing rock. The barge is 145 feet by 50 feet with a footprint of 38 by 100 feet. Fifty percent of the barge's footprint would rest on the beach during low tides. Ground pressure for the barge with the one track excavator on it would be less than that of a person walking on the beach. No bearing plates or timbers are proposed, to reduce pressure from the track excavator operating on the beach

because of coarse sediment conditions (COE, July 23, 2003). The heavy equipment corridor is limited to the 80-foot length of the property, and by 50 feet waterward of the bulkhead. Rock would be placed in about ten-foot sections to reduce likelihood of mass slope wasting. Excavated coarse grained material, sand and gravel, could be stored within a corridor extending 25 feet waterward from the base of the new bulkhead. Stockpiled sand or gravel would be removed within 72 hours after completion of bulkhead construction.

### 1.3 Description of the Action Area

An Action Area is defined by the Services' regulations (50 CFR Part 402) as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." The proposed project site is located along the Nisqually Reach in Thurston County, Washington, approximately three miles northwest of the mouth of the Nisqually River. Areas to be affected by the proposed action include the along-shore sediment transport zone, drift cell 2-6 (Schwartz, 1991). This drift cell extends from about 100 feet north of the north property line to about .6 miles south to Dogfish Bight (COE, July 2003). It includes the upland area up to the top of the steep slope (behind the residence) and 150 feet of intertidal zone from the base of the new bulkhead. Figure 1 illustrates the general area in which the action area resides.

Figure 1. Map of Project Area



## **2.0 ENDANGERED SPECIES ACT - BIOLOGICAL OPINION**

The objective of this Opinion is to determine whether the proposed action is likely to jeopardize the continued existence of the PS chinook ESU.

### **2.1 Evaluating the Proposed Action**

The standards for determining jeopardy as set forth in section 7(a)(2) of the ESA are defined by 50 CFR Part 402 (the consultation regulations). NOAA Fisheries must determine whether the action is likely to jeopardize the listed species and/or whether the action is likely to destroy or adversely modify critical habitat. Critical habitat is not currently designated for PS chinook, therefore that analysis will not be presented. The jeopardy analysis involves the initial steps of (1) defining the biological requirements of the listed species, and (2) evaluating the relevance of the environmental baseline to the species' current status.

Subsequently, NOAA Fisheries evaluates whether the action is likely to jeopardize the listed species by determining if the species can be expected to survive with an adequate potential for recovery. In making this determination, NOAA Fisheries must consider the estimated level of mortality attributable to: (1) collective effects of the proposed or continuing action; (2) the environmental baseline; and (3) any cumulative effects. This evaluation must take into account measures for survival and recovery specific to the listed salmon's life stages that occur beyond the action area. If NOAA Fisheries finds that the action is likely to jeopardize listed species, NOAA Fisheries must identify reasonable and prudent alternatives for the action.

For the proposed action, NOAA Fisheries' jeopardy analysis considers the direct or indirect effects of the action on, and the extent to which the proposed action impairs the function of habitat elements essential for spawning, rearing, feeding, sheltering, or migration of, certain ESUs of listed fish. NOAA Fisheries analysis considers how these effects influence the likelihood of survival and recovery of chinook salmon when compared to the existing environmental baseline.

#### **2.1.1 Biological Requirements**

The biological requirements are those conditions necessary for PS chinook to survive and recover to such naturally reproducing population levels that protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stock, enhance their capacity to adapt to various environmental conditions, and allow them to become self-sustaining in the natural environment.

Biological requirements are generally defined as properly functioning habitat relevant to each life history stage. In addition, there must be enough of the properly functioning habitat to ensure the continued existence and recovery of the ESU. The biological requirements for PS chinook salmon in the marine environment include adequate food (energy) sources, high water quality,



sufficient habitat structures, favorable passage conditions (migratory access to and from potential spawning and rearing areas), and appropriate biotic interactions (Spence *et al.* 1996). Specific information related to the biological requirements for PS chinook salmon can be found in Myers *et al.* (1998).

The biological requirements for PS chinook that are influenced by the proposed action include the migration and rearing habitat, food availability, and habitat structure. The placement of new riprap in the intertidal zone reduces the available habitat for salmon and their forage fish. It changes the characteristics of the remaining habitat including the interruption of natural shoreline processes.

### 2.1.2 Status of Species

After identifying the biological requirements of listed species, NOAA Fisheries must relate the status of species to the baseline. To do this, NOAA Fisheries considers the current status of the listed species, taking into account species information, *e.g.*, population size, trends, distribution, and genetic diversity. NOAA Fisheries starts with the information used in its determination to list as threatened, the ESUs considered in this Opinion. NOAA Fisheries also considers any new data relevant to the determination.

Chinook salmon are the largest of the Pacific salmon (Netboy 1958), and exhibit the most diverse and complex life history strategies of all salmonids. Healey (1986) described 16 age categories for chinook salmon, seven total ages with three possible freshwater ages. Two generalized freshwater life-history types were initially described by Gilbert (1912): "stream-type" chinook salmon that reside in freshwater for a year or more following emergence, and "ocean-type" chinook salmon that migrate to the ocean within their first year. Healey (1983; 1991) promoted the use of broader definitions for "ocean-type" and "stream-type" to describe two distinct races of chinook salmon. This racial approach incorporates life history traits, geographic distribution, and genetic differentiation and provides a valuable frame of reference for comparisons of chinook salmon populations. The generalized life history of chinook salmon involves incubation, hatching, and emergence in freshwater, migration to the ocean, and subsequent initiation of maturation and return to freshwater for completion of maturation and spawning. Some male chinook salmon mature in freshwater, foregoing emigration to the ocean.

Chinook salmon in this area all exhibit an ocean-type life history. Although some spring-run chinook salmon populations in the Puget Sound ESU have a high proportion of yearling smolt emigrants, the proportion varies from year to year and appears to be environmentally mediated rather than genetically determined. Puget Sound stocks all tend to mature at ages three and four and exhibit similar, coastally-oriented, ocean migration patterns.

NOAA Fisheries completed a status review of chinook salmon from Washington, Idaho, Oregon, and California in 1998, which identified fifteen distinct ESUs of chinook salmon in the western United States region (Myers *et al.* 1998). For the purposes of conservation under the Act, an

ESU is a distinct population segment that is substantially isolated, reproductively, from other conspecific population units and represents an important component in the evolutionary legacy of the species (Waples 1991). After assessing information concerning chinook salmon abundance, distribution, population trends, risks, and protection efforts, NOAA Fisheries determined that chinook salmon in the Puget Sound ESU are at risk of becoming endangered in the foreseeable future. Subsequently, NOAA Fisheries listed Puget Sound chinook salmon as threatened on March 24, 1999 (March 1999, 64 FR 14308). This listing extends to all naturally spawning chinook salmon populations residing below natural barriers (*e.g.*, long-standing, natural waterfalls) in the Puget Sound region from the North Fork Nooksack River to the Elwha River on the Olympic Peninsula, inclusive. Chinook salmon are found in most of the rivers in this region. The boundaries of the Puget Sound ESU correspond generally with the boundaries of the Puget Lowland Ecoregion. Five hatchery stocks considered essential for recovery of the natural stocks, including the White River hatchery stock, are also included in the ESU (Table 1 of 64 FR 14308).

The Puget Sound ESU is a complex of many individual populations of naturally spawning chinook salmon, and a number of hatchery stocks (March 1999, 64 FR 14308). Recently, the Puget Sound Technical Recovery Team (PSTRT), an independent scientific body convened by NOAA Fisheries to develop technical delisting criteria and guidance for salmon delisting in Puget Sound, identified 22 demographically independent populations of chinook salmon in the Puget Sound ESU (PSTRT 2004, BRT 2003). These population designations are preliminary and may be revised based on additional information or findings of the PSTRT.

Overall abundance of chinook salmon in this ESU has declined substantially from historical levels and many populations are small enough that genetic and demographic risks are high. At the time of listing, both long- and short-term trends in abundance were predominantly downward, and several populations were exhibiting severe short-term declines. An updated assessment of the status of the ESU indicates that about half of the populations are declining and half are increasing in abundance, based on long-term trends in abundance and median population growth rates (BRT 2003). The conclusion of the BRT after the updated assessment was that this ESU remains likely to become endangered. Reasons for the decline are summarized in section 2.1.3.

The most recent five-year geometric mean natural spawner numbers in populations of PS chinook ranges from 42 to just over 7,000 fish. Most populations contain natural spawners numbering in the hundreds (median recent natural escapement equals 481); and of the six populations with greater than 1,000 natural spawners, only two are thought to have a low fraction of hatchery fish. Estimates of historical equilibrium abundance from predicted pre-European settlement habitat conditions range from 1,700 to 51,000 potential chinook spawners per population. The historical estimates of spawner capacity are several orders of magnitude higher than spawner abundances currently observed throughout the ESU.

The artificial propagation of fall-run stocks is widespread throughout this region. Summer/fall chinook salmon transfers between watersheds within and outside the region have been commonplace throughout this century; thus, the purity of naturally spawning stocks varies from river to river. Nearly two billion chinook salmon have been released into Puget Sound tributaries since the 1950s. The vast majority of these have been derived from local returning fall-run adults. Returns to hatcheries have accounted for 57% of the total spawning escapement, although the hatchery contribution to spawner escapement is probably much higher than that due to hatchery-derived strays on the spawning grounds. The electrophoretic similarity between Green River fall-run chinook salmon and several other fall-run stocks in Puget Sound (Marshall *et al.* 1995) suggests that there may have been a significant and lasting effect from some hatchery transplants. Overall, the pervasive use of Green River stock throughout much of the extensive hatchery network, in this ESU, may reduce the genetic diversity and fitness of naturally spawning populations.

Harvest impacts on PS chinook salmon populations averaged 75% (median equals 85%; range 31-92%) in the earliest five years of data availability and have dropped to an average of 44% (median equals 45%; range 26-63%) in the most recent five-year period.

Other concerns noted by the Biological Review Team (BRT) are the concentration of the majority of natural production in just two basins, high levels of hatchery production in many areas of the ESU, and widespread loss of estuary and lower floodplain habitat diversity and, likely, associated life history types. While populations in this ESU have not experienced the sharp increases in the late 1990's seen in many other ESUs, more populations have increased than decreased since the last BRT assessment. After adjusting for changes in harvest rates, however, trends in productivity are less favorable. Most populations are relatively small, and recent abundance within the ESU is only a small fraction of estimated historic run size.

### 2.1.3 Environmental Baseline

The environmental baseline represents the current set of conditions, to which the effects of the proposed action are then added. The environmental baseline is defined as “the past and present impacts of all Federal, state, and private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or informal section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation process” (50 CFR 402.02).

The majority of land surrounding Puget Sound is composed of glacial deposits (Burns 1985). Much of the eastern shore of Puget Sound is characterized by steep bluffs composed of glacial till. Under natural conditions where the banks are not armored, material sloughs off via landslides caused by gravity, high pore pressures, wave action and erosion, bringing material ranging in size from boulders to clay sized particles, entire trees, and other vegetation to the beaches (Komar 1997). The construction of roads, rail lines, residences, utility corridors, and

other infrastructure adjacent to the shoreline requires measures to protect them from natural shoreline erosion and thus disconnects this natural shoreline process.

Anthropogenic activities have blocked or reduced access to historical spawning grounds and altered downstream flow and thermal conditions. In general, upper tributaries have been impacted by forest practices while lower tributaries and mainstem rivers have been impacted by agriculture and/or urbanization. Diking for flood control, draining and filling of freshwater and estuarine wetlands, and sedimentation due to forest practices and urban development are cited as problems throughout the ESU. Blockages by dams, water diversions, and shifts in flow regime due to hydroelectric development and flood control projects are major habitat problems in several basins. Bishop and Morgan (1996) identified a variety of habitat issues for streams in the range of this ESU including: (1) changes in flow regime (all basins); (2) sedimentation (all basins); (3) high temperatures in some stream; (4) streambed instability; (5) estuarine loss; (6) loss of large woody debris (LWD) in some streams; (7) loss of pool habitat in some streams; (8) blockage or passage problems associated with dams or other structures; and (9) decreased gravel recruitment and loss of estuary areas.

Estuaries and marine shorelines provide critical habitat for rearing and outmigrating salmonids. Recent studies have found that approximately 30% of the shoreline in the state has been armored, with approximately 1.7 miles of Puget Sound shoreline being armored each year (WDNR 2001; Berry *et al.* 2001; Canning and Shipman 1995b). In areas with armored shoreline, natural beach nourishment materials are only delivered to the intertidal zone by very large landslides where the material is recruited over or through public infrastructure. In these areas, the intertidal zone has been starved of fine grained material, resulting in a conversion from gently sloping sandy beaches to steeper cobble and hard bottom shorelines. Furthermore, the armored shoreline promotes greater erosion of the non-armored sections of shoreline, by deflecting wave energy to these locations, which causes lowering and steepening of the shoreline. The result is a decrease in shallow nearshore habitat which is extremely important for juvenile PS chinook rearing, feeding, and hiding from large predators.

These impacts on the spawning and rearing environment may also have had an impact on the expression of many life-history traits and masked or exaggerated the distinctiveness of many stocks. The Puget Sound Salmon Stock Review Group (PFMC 1997) concluded that reductions in habitat capacity and quality have contributed to escapement problems for PS chinook salmon. It cited evidence of direct losses of tributary and mainstem habitat from: (1) dams; (2) loss of slough and side-channel habitat caused by diking, dredging, and hydromodification; and (3) reductions in habitat quality due to land management activities.

In addition to providing rearing habitat, shelter, and migration corridor to PS chinook, the marine shorelines and intertidal areas of Puget Sound support spawning populations of Pacific herring (*Clupea harengus pallasi*), surf smelt (*Hypomesus pretiosus*), and sand lance (*Ammodytes hexapterus*) (WDFW 2000). Migrating salmon utilize bait fish such as Pacific herring, sand

lance and surf smelt as prey resources. These forage fish form an important trophic link between plankton resources and a wide variety of predatory marine organisms, including PS chinook.

### *2.1.3.2 Factors Affecting Species in the Action Area*

The project area lies on the shore of the Nisqually Reach, 3 miles northwest of the mouth of the Nisqually River (Figure 1). The slope between the residence and the water is about 1.5 (horizontal) to 1 (vertical). The slope is about 250 feet long, and the horizontal distance is about 200 feet. The bottom of the existing bulkhead is at 0 to 1.5 feet above mean higher high water line (Leitman 2000).

NOAA Fisheries surveyed the adjacent beach area for bank hardening and vegetation structure. Two adjacent properties on the south side are armored. The second property to the south has a bluff and many of the trees have been cut. The property to the north is armored with a concrete bulkhead. The second property to the north is not armored. It is covered by natural mature woody vegetation. A wooden staircase leads through the vegetation to provide beach access. Some leaning and fallen trees at the upper edge of the beach suggest that it provides input of LWD and sediment. This property gives an example of what the shore line would look like if it had not been heavily developed.

The project site lies along drift cell segment 2-6<sup>1</sup> (Schwartz *et al.*, 1991). About half of the drift cell shoreline appears armored by bulkheads. (COE, July 23, 2003) evidenced by the need for bank stabilization described by the project proponent and NOAA Fisheries' observations of the undeveloped property to the north, the project area appears to be an erosional beach.

The sediment conditions in the area are such that the upper soils are of low permeability while the underlying soil is nearly impervious. Clovis sands deposited via outwash in front of the Vashon continental ice sheet were then covered by the ice sheet and compacted by its weight. The sediments underlying the Clovis sands were compacted by the combined weight of Clovis sands and the ice sheet. (Strong, 1999) These soil conditions lead to groundwater flow on top of the underlying sediments.

The low permeability of the Clovis sand means that stormwater will run over the ground surface ("surface runoff") rather than soaking into the ground. Surface runoff renders certain slopes vulnerable to landslides and mass failures. Vegetation removal and added impervious surface

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<sup>1</sup>This drift cell originates at a zone of divergence along the Nisqually Reach approximately 1.6 kilometers north of Dogfish Bight. Sediment is transported south to a terminus in Dogfish Bight as evidenced by several obstructions to drift with sediment accumulated on the north side, sediment size fining to the south, and increased beach width to the south. The terminus area in Dogfish Bight is a prograding beach composed predominantly of sand. (Schwartz 1991)

(such as occurs when homes are built above slopes) increases this vulnerability to land movement and slides. The West property exhibits both conditions: added impervious surface areas (the residence, a large concrete terrace, and walkways) and removal of most of the mature trees from the slope between the residence and the water.

The COE, through Strong (1999), assumes high hydrostatic pressure behind the failing bulkhead. Pressure behind the bulkhead probably accounts for existing cracks in the bulkhead. Rotting logs in the bulkhead have probably caused cracks and shifts in the existing bulkhead. Strong (1999) recommended placing new bulkhead in front (waterward) of the existing bulkhead, anticipating future problems related to hydrostatic pressure on the existing bulkhead. Concerns are that if the existing bulkhead were removed before building the new bulkhead, or if the new bulkhead was not built, the slope would likely suffer a mass wasting event. A system draining the residence and the concrete terrace has been installed to minimize the risk of land slides. The drainage system discharges water through pipes in the bulkhead into the intertidal area..

However,

the risk of a slide or partial slope failure remains relatively high, due to the lack of deep rooted woody vegetation; it is likely that parts of the hill may slide in a large rainstorm or seismic event. In similar locations WDFW observed parts of the hill sliding over the bulkhead onto the beach (pers. com. Margie Schirato and Neil Rickard), and a small slide event occurred within the last ten years and destroyed the boat house that the applicant now proposes to re-build.

The list of likely negative effects that would result from a slide is substantial: loss of potential sand lance spawning habitat; introduction of non-native material into the intertidal zone; and loss of more near shore habitat by follow-up stabilization attempts (see section 2.2.1.2, below).

While there are no documented spawning beaches for any of the three forage fish (sand lance, surf smelt, or Pacific herring) in the action area, sand lance spawning sites were found approximately 400 feet southwest of the project location (Penttila, 1995). The WDFW plankton surveys and ongoing exploratory spawning habitat surveys suggest that there are very few, if any, bays and inlets in the PS basin that could not support sand lance spawning activity. Sand lance deposit eggs on a rather broad range of beach surface substrates, from soft, pure fine sand beaches to beaches armored with gravel up to 3 cm in diameter, although most spawning appears to occur on the finer grained substrates. Spawning occurs at tidal elevations ranging from plus 5 feet to about the mean higher high water line. After deposition, sand lance eggs may be scattered over a wider range of the intertidal zone by wave action. The incubation period is about four weeks (<http://wdfw.wa.gov/fish/forage/lance.htm#lbiology>). Sand lance spawning timing in the Nisqually Reach extends from October 15 to March 1 (Leitman, 2000).

#### 2.1.4 Status of the Species within the Action Area

The PS chinook stock closest to the action area is the Nisqually Fall chinook. Currently, production consists primarily of on-station hatchery releases with some natural spawning. The biological significance of the present Nisqually chinook stock is relatively low due to the extirpation of the native population and the mixed hatchery origin of the remaining population.

The viability of this stock in nature is unknown at this time (Nisqually Chinook Recovery Team, August 2001).

Nisqually River chinook enter the river from July through September. Peak spawning is mid-October. Seaward migration of Nisqually chinook is assumed to be predominantly in the spring and summer of the first year of freshwater residence (ocean-type life history). However, Tyler (1980) reported juvenile chinook in the river as late as December. This suggest that a portion of the stock emigrates in the fall or the following spring as yearling smolts (Nisqually Chinook Recovery Team, August 2001). After smoltification, chinook generally migrate north utilizing near shore habitat. Migration is not thought to proceed in a straight line north. Kurt Fresh, NOAA Fisheries, reported that South Puget Sound near shore areas provide rearing habitat for some Lake Washington and Green River stocks (Fresh, 2003). Thus juveniles from the Nisqually River Stock as well as from some other south Puget Sound rivers can be expected to use the near shore habitat in the Nisqually Reach.

Habitat function in the action area do not meet biological requirements of PS chinook salmon for the life history they express in the action area. The status of PS chinook as a threatened species is in large part a function of declining conditions in the species' environment range-wide, at the ESU scale: various anthropogenic factors, such as deforestation, shoreline hardening, and disruption of hydrologic processes, have negatively influenced the biotic features necessary to support healthy populations of chinook. Other factors, such as ocean conditions, harvest levels, and natural mortality from predation and disease also influence the current status of the ESU. The environmental baseline in the action areas contribute at a very low level to the net effect of depressing the population's viability. To improve the status of the ESU and contribute to its ability to recover, improvement in habitat conditions over the baseline condition is necessary, not merely within the action area, which by itself is of limited influence, but rangewide, as well.

## **2.2 Analysis of Effects**

In this analysis, the probable direct and indirect effects of the action on the PS chinook salmon are identified. The ESA implementing regulations direct NOAA Fisheries to do so "together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02)."

### **2.2.1 Direct Effects**

Direct effects are the immediate effects of the project on the species or its habitat. Direct effects result from the agency action and include the effects of interrelated actions and interdependent actions. Future Federal actions that are not a direct effect of the action under consideration (and not included in the environmental baseline or treated as indirect effects) are not evaluated. (USFWS & NMFS 1998)

Direct effects will result from sediment disturbance, alteration of near shore habitat, and loss of near shore habitat.

#### *2.2.1.1 Sediment Disturbance and Turbidity*

The construction activities include excavation and placement of rock in front of the existing bulkhead. This work would be performed by a track hoe operating in the dry in the work corridor waterward of the bulkhead. The excavation, track hoe movement, and rock placement would disturb the soil. At high tide the disturbed soil would come in contact with water. This soil disturbance is expected to result in a short-term, localized increase in turbidity. The magnitude of the increase in turbidity is expected to be small because the sediment is coarse sand and gravel.

To reduce the disturbance from the track hoe to the sediment, the WDFW requires and the applicant must comply with the following measures during construction (WAC 220-110-285): (1) use of machinery on the beach will be confined to a 25-foot wide corridor immediately waterward of the new bulkhead face; (2) work at the site will take place during the allowed work window as defined above; (3) work will not occur if tidal waters are within 30-foot of the bulkhead face; (4) excavated material will be placed within the designated work corridor and covered to prevent erosion; (5) all trenches, depressions and/or holes created in the beach will be backfilled prior to inundation by tidal waters. Trenches excavated for the placement of the base rocks can remain open during construction, but fish must be prevented from entering the trenches (the turbidity barrier will help to fulfill this requirement); and (6) the appropriate sized gravel will be spread on the beach following construction.

Adverse effects of turbidity on juvenile salmonids are dependent on exposure duration and intensity. Effects include, alarm reaction, avoidance, and short-term reduction in feeding success (Newcombe and Jensen, 1996). Also, turbidity might affect the migration of juvenile salmonids along the altered shoreline by creating a migration barrier in the upper intertidal area. To minimize construction effects on juvenile salmonids the six minimization measures listed above would be followed and work would be performed in the summer work window, June 15 through October 15. Some juvenile PS chinook are likely to occupy the near shore area of the Nisqually Reach during the summer work window. Most of them are expected to have moved north (see section 2.1.2.2). NOAA Fisheries considers the construction impact on juvenile PS chinook from the construction to be small, because of the use of minimization measures, the short duration of the work, small area of the impact, and the coarseness of the sediments.

While sand lance spawning has not been documented in the action area, NOAA Fisheries assumes they are present in some years because of suitable sediment and elevation, the close proximity to known spawning sites, and their wide distribution (see section 2.1.2.2.). The disturbance of sediments, including the compaction, caused by the proposed work is likely to negatively impact potential surf smelt spawning. Leitman (2000) references that damage to forage fish spawning habitat by machinery on the beach is usually repaired naturally within two



months. The construction that would take place within the two months prior to sand lance spawning would cause some negative effects on sand lance, likely reducing forage opportunities for PS chinook.

#### *2.2.1.2 Shoreline modification*

The new rock bulkhead would be placed 5 feet waterward of the existing bulkhead. This causes the loss of a maximum of 400 square feet of intertidal habitat. The mean higher high water line is at zero to 1.5 feet waterward of the toe of the existing bulkhead. That means that at the existing conditions for 50% of all high tides the shallowest water area would be lost. The construction of the new bulkhead would increase the mean water depth in front of the bulkhead.

As described in section 2.2.1.1, NOAA considers the action area suitable habitat for sand lance spawning. Sand lance spawn up to the mean higher high water line which is at the bottom of the existing bulkhead (section 2.1.2.2). Covering up 400 square feet in front of the existing bulkhead thus has to be considered a reduction in the available habitat for sand lance spawning. If spawning habitat is limiting to sand lance production the availability of forage fish to PS chinook would be reduced.

Losing shallow intertidal areas is also likely to increase the risk of predation on juvenile PS chinook. Juvenile chinook are thought to use the shallow water areas to evade piscivorous predators. As a result, NOAA Fisheries assumes that the proposed project is likely to increase juvenile PS chinook mortality.

#### 2.2.2 Indirect Effects

Indirect effects are caused by or result from the proposed action, are later in time, and are reasonably certain to occur. Indirect effects may occur outside of the area directly affected by the action. Indirect effects may include other Federal actions that have not undergone section 7 consultation but will result from the action under consideration. These actions must be reasonably certain to occur, or they are a logical extension of the proposed action (50 CFR 402.02).

Indirect effects include the permanent adverse effects that would result from a potential landslide, including further loss of sand lance spawning habitat and increased erosion in front of the proposed bulkhead.

##### *2.2.2.1 Shoreline Alterations*

The addition of the rock bulkhead in front of the existing concrete bulkhead lengthens the time for which natural shoreline processes are interrupted. Tait and Griggs (1991) have stated that the impoundment of sediments behind seawalls, bulkheads, or revetment is the least controversial and most significant impact of shoreline armoring. Shoreline hardening cuts off the input of

sediment and LWD. This often leads to coarsening of substrate, beach lowering, and increased erosion in front of beaches located at downdrift locations (Dean 1986; Everts 1985). NOAA Fisheries expects that placing the new bulkhead waterward of the existing bulkhead will accelerate these processes.

Evidence collected at Sunnyside Beach, Steilacoom, by the COE suggests that bulkheading beaches result in a coarsening of the beach material in front of the bulkheads (Macdonald *et al.* 1994). As wave action and littoral drift continue to remove the finer sediment from a beach and there is no bank erosion to replenish this finer material, the sediment in front of the bulkhead will become coarser (gravel and cobbles, as opposed to sand and finer gravel). In concert the beach profile is likely to lower and narrow (Galster and Schwartz 1990).

Coarser beach material, above 3 cm in diameter, is not used for spawning by sand lance. Also, sand lance are not known to spawn below plus 5 feet median lower low water. The expected changes of the nearshore are likely to slowly reduce the suitable spawning habitat for these forage fish. This would mean a reduction in food source for salmon. Lowering of the beach would reduce the amount of available shallow habitat that juveniles rely on for food and cover.

Input of LWD from trees that fall into the near shore area has many benefits for salmon. Trees provide input of nutrients and shelter from predators. LWD also can provide protection to the beach from erosion. The proposed action will delay contributions of LWD to the nearshore environment.

Strong (1999) assumes high hydrostatic pressure behind the failing bulkhead. The build-up of hydrostatic pressure relates to the existence of the old bulkhead, impermeable soils, added impervious surface, and past slope devegetation. The symptoms of the pressure build-up are manifest in the cracks developing in the old bulkhead. In the short-term, the new bulkhead addresses the symptom of the problem (cracks in the existing bulkhead) rather than the causes (surface runoff and lack of vegetation). To the extent that the existing bulkhead contributed to the vulnerability of the slope to slides and failure, adding the new bulkhead waterward of the existing one perpetuates that condition. Furthermore, cracking in the existing bulkhead suggests that there is a high probability the slope will fail either incrementally or massively some time in the future.

Of the underlying causes of hydrostatic pressure build-up at the project site, the runoff from impervious surface has been addressed with a drainage system. However, the lack of native woody vegetation remains a risk factor that can be reduced. Planting new vegetation on this slope would have two effects. First, growing vegetation would increase evapotranspiration alleviating hydrostatic pressure over time. Second, new vegetation would increase rooting structure, increasing soil and slope stability over time.

Perpetuating the vulnerability of the slope to a mass failure event could adversely effect salmonids and their forage fish. While beach nourishment in general is beneficial at a location

where it has been impeded by bank hardening, natural beach nourishment at this location (in the absence of a bulkhead) would take place more gradually than a mass slope failure (facilitated by lack of deep rooted woody vegetation).

If large amounts of upland soil were to cover sand lance spawning habitat it may inhibit spawning for one to several seasons, due to changes in elevation and substrate size (the upland soils at the West property are finer than the existing beach material). A mass failure event also may introduce non-native material into the intertidal zone: concrete, treated wood from a crib wall, and material from the boat house. Effects from emergency repairs would also negatively impact the near shore habitat; often when a slide occurs, a new bulkhead is build at the toe of the slide to attempt to stabilize the slide area. In this manner, intertidal habitat is lost, and potential benefits in the form of gradual beach nourishment are not realized (pers. com. Neil Rickard)

## **2.3 Cumulative Effects**

Cumulative effects are defined as “those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation” (50 CFR 402.02). Future Federal actions that are unrelated to the proposed action are not considered in this section because they might require separate consultation pursuant to section 7 of the ESA.

Thurston County’s shorelines have been steadily developed over the last years. NOAA Fisheries can find no reason to expect a halt or substantial change in development trends. Additional shoreline armoring projects are likely to occur to protect new private residences, further contributing to the cumulative loss of natural erosional processes in the drift cell. New and existing housing developments along the action area will continue to result in degradations to the natural shoreline processes from armoring projects, marinas, and other infrastructures related to growth and development. While all of these future actions are likely to impact habitat for aquatic species, only a subset will fall under future consultations. For example bulkheads constructed above median higher high water do not require a COE permit and thus no section 7 consultation. Projects that do not go through consultation will be components contributing to the cumulative effects.

## **2.4 Conclusion**

NOAA Fisheries concludes that the proposed action is not likely to jeopardize the continued existence of PS chinook. The conclusion that the project will not impair the likelihood of survival or recovery of PS chinook salmon factored the effects of the baseline conditions of the action area, the likely direct and indirect effects of the proposed project on the species, and the anticipated cumulative effects to the species.

The status of PS chinook is threatened because of human induced loss of habitat and habitat modifications. Baseline conditions in the action area are degraded by development, including bulkheads. Thus, presently the biological requirements for PS chinook are not met.

Even though the proposed project is expected to further degrade an already degraded baseline, the location and the magnitude of all the adverse impacts from this project allow NOAA Fisheries to conclude via a qualitative analysis that the impact is not likely to jeopardize the continued existence of PS chinook. The PS chinook stock that would be most impacted by the project is the Nisqually River stock. The Nisqually River stock has a low biological significance and is of little importance to PS chinook recovery (Nisqually Chinook Recovery Team, August 2001). The magnitude of the proposed project is small, 80 linear feet of bulkhead and 400 square feet of lost intertidal habitat. NOAA Fisheries considers all long-term direct and indirect effects on PS chinook habitat and PS chinook food base to be equally limited in extent. The construction effects on juvenile PS chinook are expected to be small, because of the use of minimization measures, the short duration of the work, small scale of the impact, and the coarseness of the sediments at the site.

## **2.5 Reinitiation of Consultation**

Consultation must be reinitiated if the amount or extent of take specified in the Incidental Take Statement is exceeded, or is expected to be exceeded; new information reveals effects of the action may affect listed species in a way not previously considered; the action is modified in a way that causes an effect on listed species that was not previously considered; or a new species is listed or habitat is designated that may be affected by the action (50 CFR 402.16).

## **2.6 Incidental Take Statement**

Section 9 of the ESA prohibits take of endangered species. Federal regulation pursuant to section 4(d) of the Act extends the take prohibition to threatened species. “Take” is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect listed species, or to attempt to engage in any such conduct. “Harm” is defined as significant habitat modification or degradation that actually kills or injures listed species by “significantly impairing behavioral patterns such as breeding, spawning, rearing, migrating, feeding, and sheltering” (50 CFR 222.102). “Harass” is defined as an intentional or negligent act which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering (50 CFR 17.3).

“Incidental take” is take of listed animal species that results from, but is not the purpose of an otherwise lawful activity carried out by the Federal agency or the applicant. Under the terms of section 7(o)(2), incidental take is not prohibited, provided that such taking is in compliance with the terms and conditions of the incidental take statement required by section 7(b)(4) (16 U.S.C. 1536).

An incidental take statement specifies the effects of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures that are necessary to minimize the effect of the incidental take and sets forth terms and conditions with which the action agency, its applicant, or both, must comply to implement the reasonable and prudent measures.

#### 2.6.1 Amount or Extent of Take Anticipated

Because PS chinook use the action area for migration and foraging they are reasonably likely to experience effects from the proposed action. They are expected to be present in the action area during part of the year every year, exposing juveniles in all following years to the permanent changes in their habitat. And juveniles are likely to be present in low numbers during the construction, exposing them the short-term construction impacts. Therefore, incidental take of PS chinook is reasonably certain to occur.

Take caused by the proposed action is likely to be in the form of harm, where habitat modification will impair normal behavioral patterns of listed salmonids to the degree of injury or death. Here, the ability of PS chinook to use the area to rear and forage will be diminished by the extent to which production of forage species are affected. Because the presence of fish is highly variable over time, and the numbers of fish present in any given area is not strictly related to habitat quality, the amount of take that will occur from this diminution is difficult to estimate. In instances where the number of individual animals to be taken cannot be reasonably estimated, NOAA Fisheries characterizes the amount as “unquantifiable” and uses a habitat surrogate to identify the extent of take. The surrogate provides an obvious threshold for anticipated take which, if exceeded, provides a basis for reinitiating consultation.

This Opinion analyzes the effects that would result from loss or decreased function of near shore habitat that produce foraging opportunities for PS chinook. The extent of take NOAA Fisheries anticipates in this statement is that reduction in fish survival which would result from the installation of 80 linear feet of rock armoring, resulting in the loss of 400 square feet intertidal habitat along the Nisqually Reach. In addition, NOAA expects take in the form of harassment to juvenile chinook, resulting from the three-day increase in turbidity. Should either of these areal or temporal parameters be exceeded during construction the reinitiation provisions of the Opinion shall apply, because the action may affect species in a way not previously considered.

#### 2.6.2 Reasonable and Prudent Measures

NOAA Fisheries believes that the following reasonable and prudent measures (RPMs) are necessary and appropriate to minimize incidental take of PS chinook:

1. The COE shall minimize take from construction impacts from sediment disturbance and pollutants on rearing and migration juvenile PS chinook and sand lance spawning.

2. The COE shall minimize take from perpetuation of interrupted shoreline processes and potential mass wasting.

### 2.6.3 Terms and Conditions

To comply with ESA section 7 and be exempt from the take prohibition of ESA section 9, the COE must comply with the terms and conditions that implement the reasonable and prudent measures. The terms and conditions are non-discretionary.

To implement RPM No. 1 above the COE shall ensure that:

- a. The one piece of heavy equipment to be used on the beach shall be a wide tracked vehicle. Beach work, including rock placement shall occur at low tide when the work corridor is not inundated by tidal waters.
- b. Prior to operating, all heavy equipment on the beach and on the barge shall be checked on a daily basis for potential hydraulic leaks or other mechanical problems that could result in the accidental discharge of toxic materials. A daily inspection log/checklist shall be maintained by the contractor.
- c. Contractors shall prepare an approved spill prevention and response plan prior to construction. Spill cleanup materials and trained operators shall be available on site at all times during operation.
- d. All of the excavated material for the footer rocks should be used as beach nourishment. Only sand and gravel shall be used. Finer material, silt and clay, shall be removed from the beach. After completion of the project the excavated material shall be distributed directly in front of the new bulkhead. The material shall be free of any man made debris and big rocks. It shall be distributed along the entire 80 feet of the new bulkhead. It shall be about 9 feet wide, 0.5 feet deep. If more material is available than fits in the 9 feet by 80 feet by 0.5-foot then it may be piled up against the new bulkhead up to two feet high.
- e. Excavated sand and gravel may be stockpiled within a 25 work corridor waterward of the base rocks. Excavated materials containing silt, clay, or other fine grained soil shall not be stockpiled below the ordinary high water line.
- f. NOAA Fisheries shortens the WDFW work window, in which the COE's applicant can construct the bulkhead, by two months to June 15 through August 15. This will allow for the sediment to repair itself and beach nourishment to distribute itself prior to surf smelt potentially spawning at the action area and thus minimize impacts to salmonid food sources. (Leitman (2000) references that

damage to forage fish spawning habitat by machinery on the beach is usually repaired naturally within two months.)

To implement RPM No. 2 above, the COE shall ensure that:

- a. To maximize drainage, the exiting concrete bulkhead shall be made permeable to water at least every 3 feet on center over the entire area of the exposed part of the bulkhead. Existing drainage features can be used or counted toward this requirement.
- b. To stabilize the slope the entire slope beginning immediately landward of the bulkhead to the lower extent of the concrete terrace below the residence shall be vegetated with native woody vegetation. Existing concrete walkways and footprint for the boat house are exempt. The applicant shall submit a vegetation plan to NOAA Fisheries, see address below, prior to construction of the proposed bulkhead.
  - Planting shall occur the planting season prior or immediately following the construction of the bulkhead. Plantings shall be limited to native western Washington woody vegetation. The species mix needs to include a minimum of 10% Douglas Fir (*Pseudotsuga menziesii*) and 10% willow (*Salix sp.*). Plantings shall be spaced at a minimum of 10 feet on center, potentially denser depending on species.
  - All plantings will be monitored for at least five years to ensure 80% survival; replanting will occur in the planting season immediately following the death of the saplings if survival rates are less than 80%.
  - In year one, two three, five, and seven, a monitoring report detailing weed control, summer watering regime, percent survival by species, number of trees by species replanted from last years plant death will be submitted to:

NOAA Fisheries  
Washington State Habitat Office  
Attn: Stephanie Ehinger  
510 Desmond Drive SE, Suite 103  
Lacey, WA 98503

### **3.0 MAGNUSON-STEVENSON FISHERY CONSERVATION AND MANAGEMENT ACT**

#### **3.1 Background**

The MSA established procedures designed to identify, conserve, and enhance EFH for those species regulated under a Federal fisheries management plan. Pursuant to the MSA:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (section 305(b)(2));
- NOAA Fisheries must provide conservation recommendations for any Federal or state action that would adversely affect EFH (section 305(b)(4)(A));
- Federal agencies must provide a detailed response in writing to NOAA Fisheries within 30 days after receiving EFH conservation recommendations. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with NOAA Fisheries EFH conservation recommendations, the Federal agency must explain its reasons for not following the recommendations (section 305(b)(4)(B)).

The term “EFH” means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA section 3). For the purpose of interpreting this definition of EFH: Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species’ contribution to a healthy ecosystem; and “spawning, breeding, feeding, or growth to maturity” covers a species’ full life cycle (50 CFR 600.10). Adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (*e.g.*, contamination or physical disruption), indirect (*e.g.*, loss of forage or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

An EFH consultation with NOAA Fisheries is required for any Federal agency action that may adversely affect EFH, including actions that occur outside EFH, such as certain upstream and upslope activities.

The objectives of this EFH consultation are to determine whether the proposed action would adversely affect designated EFH and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH.



### **3.2 Identification of Essential Fish Habitat**

Pursuant to the MSA the Pacific Fisheries Management Council (PFMC) has designated EFH for federally-managed fisheries within the waters of Washington, Oregon, and California. Designated EFH for groundfish and coastal pelagic species encompasses all waters from the mean high water line, and upriver extent of saltwater intrusion in river mouths, along the coasts of Washington, Oregon and California, seaward to the boundary of the U.S. exclusive economic zone (370.4 km) (PFMC 1998a, 1998b). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC 1999), and longstanding, naturally-impassable barriers (i.e., natural waterfalls in existence for several hundred years) (PFMC 1999). In estuarine and marine areas, designated salmon EFH extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone (370.4 km) offshore of Washington, Oregon, and California north of Point Conception to the Canadian border (PFMC 1999).

Detailed descriptions and identifications of EFH are contained in the fishery management plans for groundfish (PFMC 1998a), coastal pelagic species (PFMC 1998b), and Pacific salmon (PFMC 1999). Casillas *et al.* (1998) provides additional detail on the groundfish EFH habitat complexes. Assessment of the potential adverse effects to these species' EFH from the proposed action is based, in part, on these descriptions and on information provided by the COE.

### **3.3 Proposed Actions**

The proposed action and action area are detailed above in Sections 1.2 and 2.1.3 of this document. The project encompasses habitats that have been designated as EFH for various life-history stages of 46 species of groundfish, four coastal pelagic species, and three species of Pacific salmon (Table 1).

### **3.4 Effects of Proposed Action**

As described in detail in section 2.2 of this document, the proposed action may result in short- and long-term adverse effects to a variety of habitat parameters. These adverse effects are:

1. Short-term degradation of habitat because of sediment disturbance.
2. Long-term degradation of habitat because of loss of 400 square feet of near shore habitat and 80 linear feet of shoreline armoring.

### **3.5 Conclusion**

NOAA Fisheries concludes that the proposed action would adversely affect the EFH for the groundfish, coastal pelagic, and Pacific salmon species listed in Table 1.

### **3.6 Essential Fish Habitat Conservation Recommendations**

Pursuant to section 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations to Federal agencies regarding actions which may adversely affect EFH. Although NOAA Fisheries understands that the conservation measures described in the BA will be implemented by the COE, it does not believe that these measures are sufficient to address the adverse impacts to EFH described above. Consequently, NOAA Fisheries recommends that the COE implement the following conservation measures to minimize the potential adverse effects to designated EFH listed in Table 1.

1. To minimize the adverse effects of short-term degradation of habitat from sediment disturbance and chemical spills, the following conservation measures are recommended:
  - a. The one piece of heavy equipment to be used on the beach should be a wide tracked vehicle. Beach work, including rock placement should occur at low tide when the work corridor is not inundated by tidal waters.
  - b. Prior to operating, all heavy equipment on the beach and on the barge should be checked on a daily basis for potential hydraulic leaks or other mechanical problems that could result in the accidental discharge of toxic materials. A daily inspection log/checklist should be maintained by the contractor.
  - c. Contractors should prepare an approved spill prevention and response plan prior to construction. Spill cleanup materials and trained operators should be available on site at all times during operation.
  - d. All of the excavated material for the footer rocks should be used as beach nourishment. Only sand and gravel should be used. Finer material, silt and clay, shall be removed from the beach. After completion of the project the excavated material shall be distributed directly in front of the new bulkhead. The material shall be free of any man made debris and big rocks. It shall be distributed along the entire 80 feet of the new bulkhead. It shall be .5 feet deep and 9 feet wide. If more material is available than fits in the 9 feet by 80 feet by 0.5-foot then it may be piled up against the new bulkhead up to 2 feet high.
  - e. Excavated sand and gravel may be stockpiled within a 25 work corridor waterward of the bas rocks. Excavated materials containing silt, clay, or other fine grained soil shall not be stockpiled below the ordinary high water line.

- f. NOAA Fisheries shortens the WDFW work window, in which the COE's applicant can construct the bulkhead, by two months to June 15 through August 15. This will allow for the sediment to repair itself and beach nourishment to distribute itself prior to surf smelt potentially spawning at the action area and thus minimize impacts to salmonid food sources. (Leitman (2000) references that damage to forage fish spawning habitat by machinery on the beach is usually repaired naturally within two months.)
2. To offset the adverse effects of loss of near shore habitat, the adverse long-term effects of shoreline armoring, and potential mass wasting the following conservation measures are recommended:
    - a. To maximize drainage the exiting concrete bulkhead should be made permeable to water at least every 3 feet on center over the entire area of the exposed part of the bulkhead. Existing drainage features can be used or counted toward this requirement.
    - b. To stabilize the slope the entire slope beginning immediately landward of the bulkhead to the lower extent of the concrete terrace below the residence should be vegetated with native woody vegetation. Existing concrete walkways and footprint for the boat house are exempt. The applicant should submit a vegetation plan to NOAA Fisheries, see address below, prior to construction of the proposed bulkhead.
      - Planting should occur the planting season prior or immediately following the construction of the bulkhead. Plantings should be limited to native western Washington woody vegetation. The species mix needs to include a minimum of 10% Douglas fir (*Pseudotsuga menziesii*) and 10% willow (*Salix sp.*). Plantings should be spaced at a minimum of 10 feet on center, potentially denser depending on species.
      - All plantings will be monitored for at least five years to ensure 80% survival; replanting will occur in the planting season immediately following the death of the saplings if survival rates are less than 80%.
      - In year one, two three, five, and seven, a monitoring report detailing weed control, summer watering regime, percent survival by species, number of trees by species replanted from last years plant death will be submitted to:

NOAA Fisheries  
Washington State Habitat Office  
Attn: Stephanie Ehinger  
510 Desmond Drive SE, Suite 103  
Lacey, WA 98503

### **3.7 Statutory Response Requirement**

Pursuant to the MSA (section 305(b)(4)(B)) and 50 CFR 600.920(k), Federal agencies are required to provide a detailed written response to NOAA Fisheries' EFH conservation recommendations within 30 days of receipt of these recommendations. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity on EFH. In the case of a response that is inconsistent with the EFH conservation recommendations, the response must explain the reasons for not following the recommendations, including the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects.

### **3.8 Supplemental Consultation**

The COE must reinitiate EFH consultation with NOAA Fisheries if the proposed action is substantially revised in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 CFR 600.920(l)).

Table 1. Fish species with designated EFH in Puget Sound

<b>Groundfish Species</b>	redstripe rockfish <i>S. proriger</i>	Dover sole <i>Microstomus pacificus</i>
spiny dogfish <i>Squalus acanthias</i>	rosethorn rockfish <i>S. helvomaculatus</i>	English sole <i>Parophrys vetulus</i>
big skate <i>Raja binoculata</i>	rosy rockfish <i>S. rosaceus</i>	flathead sole <i>Hippoglossoides elassodon</i>
California skate <i>Raja inornata</i>	roughey rockfish <i>S. aleutianus</i>	petrale sole <i>Eopsetta jordani</i>
longnose skate <i>Raja rhina</i>	sharpchin rockfish <i>S. zacentrus</i>	rex sole <i>Glyptocephalus zachirus</i>
ratfish <i>Hydrolagus colliei</i>	splitnose rockfish <i>S. diploproa</i>	rock sole <i>Lepidopsetta bilineata</i>
Pacific cod <i>Gadus macrocephalus</i>	striptail rockfish <i>S. saxicola</i>	sand sole <i>Psettichthys melanostictus</i>
Pacific whiting (hake) <i>Merluccius productus</i>	tiger rockfish <i>S. nigrocinctus</i>	starry flounder <i>Platichthys stellatus</i>
black rockfish <i>Sebastes melanops</i>	vermilion rockfish <i>S. miniatus</i>	arrowtooth flounder <i>Atheresthes stomias</i>
bocaccio <i>S. paucispinis</i>	yelloweye rockfish <i>S. ruberrimus</i>	
brown rockfish <i>S. auriculatus</i>	yellowtail rockfish <i>S. flavidus</i>	<b>Coastal Pelagic Species</b>
canary rockfish <i>S. pinniger</i>	shortspine thornyhead <i>Sebastolobus alascanus</i>	anchovy <i>Engraulis mordax</i>
China rockfish <i>S. nebulosus</i>	cabezon <i>Scorpaenichthys marmoratus</i>	Pacific sardine <i>Sardinops sagax</i>
copper rockfish <i>S. caurinus</i>	lingcod <i>Ophiodon elongatus</i>	Pacific mackerel <i>Scomber japonicus</i>
darkblotch rockfish <i>S. crameri</i>	kelp greenling <i>Hexagrammos decagrammus</i>	market squid <i>Loligo opalescens</i>
greenstriped rockfish <i>S. elongatus</i>	sablefish <i>Anoplopoma fimbria</i>	<b>Pacific Salmon Species</b>
Pacific ocean perch <i>S. alutus</i>	Pacific sanddab <i>Citharichthys sordidus</i>	chinook salmon <i>Oncorhynchus tshawytscha</i>
quillback rockfish <i>S. maliger</i>	butter sole <i>Isopsetta isolepis</i>	coho salmon <i>O. kisutch</i>
redbanded rockfish <i>S. babcocki</i>	curlfin sole <i>Pleuronichthys decurrens</i>	Puget Sound pink salmon <i>O. gorbuscha</i>

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